

MISCELLANEOUS.

Observations on the Zoological Characters and Natural Affinities of
Æpyornis. By MM. A. MILNE-EDWARDS and A. GRANDIDIER.

M. A. GRANDIDIER has made some excavations in marshy ground at Amboulitsate in Madagascar, and obtained bones of *Æpyornis*. These bones are:—1st, a perfect tibia and several fragments of that bone; 2nd, a nearly complete femur; 3rd, two vertebræ; 4th, a tolerably well preserved femur and fragments of the same bone belonging to smaller individuals of *Æpyornis*; and, 5th, a very imperfect femur belonging to a still smaller specimen. The authors notice briefly the peculiarities presented by these bones.

The tibia is enormous, and has its articular extremities singularly enlarged. Its length is 64 centimetres, the circumference of its upper extremity 45 centimetres, and that of its inferior 38, the body of the bone in its most contracted portion being only $15\frac{1}{2}$ centimetres round. The characters of the bone prove at once that it belonged to a bird of the brevipennate order. It differs from the tibia of *Dinornis* and *Palapteryx* in having no osseous bridge over the groove of the extensor muscle of the toes, in this respect agreeing with the existing Brevipennes; but the general proportions of the bone are quite different. The tibia is more massive than even that of *Dinornis elephantopus*.

The largest femur found at Amboulitsate seems to agree, in the dimensions of its articular surface, with the tibia just mentioned. The proportions of this bone are very singular; its thickness is extraordinary, whilst in length it does not measure one-half more than its lower extremity. Behind and above the condyles there is an enormous pit, into which open large orifices for the admission of air into the interior of the bone. These orifices are absent in *Apteryx* and *Dinornis*.

A fragmentary tarso-metatarsal bone has been received by the Museum of Paris from M. Liénard since the publication of the observations of M. Geoffroy St.-Hilaire. The authors state that this bone shows a remarkable widening, combined with a very distinct flattening, in an antero-posterior direction. The width of the diaphysis at its narrowest point is 8 centims., whilst in *Dinornis giganteus* the width of this part is only $5\frac{1}{2}$ centims. As the last-named species attained a height of 3 metres, it was concluded, from this difference in the tarso-metatarsus, that *Æpyornis* must have been at least 3.60 metres in height. This measurement, however, is deceptive as a basis for calculating the size of the animal. At the upper extremity of the tarso-metatarsus are the two furrows which indicate the original separation of the three elements of the metatarsus; and as these occur only immediately below the articular extremity, the bone must be very nearly complete. Its length could not have exceeded 38 centims. The investigation of this bone is considered by the authors to show the alliance of *Æpyornis* to *Dinornis*; and they entirely reject M. Biancoui's opinion that

Æpyornis was a rapacious bird, probably identical with Marco Polo's roc. The absence of the hind toe seems to set this question at rest. The probable height of the bird is 2 metres, about equal to that of a large ostrich; but, although it can no longer be regarded as the tallest, it is at present, say the authors, "the stoutest, the most massive, and the most *elephantine*" of known birds.

M. Grandidier's excavations furnished remains of several smaller species of *Æpyornis*. One of these (called *Æ. medius*) would appear to have been of the size of the cassowary; another (*Æ. modestus*) about as large as the great bustard. Thus there was formerly in Madagascar a population of large terrestrial birds, resembling in their structure the *Dinornis*, *Palapteryx*, and *Apteryx* of New Zealand.—*Comptes Rendus*, Oct. 11 1869, pp. 801–805.

Reptile Remains and Climaxodus.

To the Editors of the Annals and Magazine of Natural History.

GENTLEMEN,—In your issue for June last, you kindly permitted me to describe a reptilian bone from the Northumberland Coal-measures. In the short communication referred to I described the bone as a malar of a Coal-measure Labyrinthodont.

In your October issue Messrs. Hancock and Atthey, who have contributed several papers to your pages, expressed their non-acceptance of the correctness of my interpretation of the bone in question, and adduced reasons for believing that it is the cranial shield of *Anthracosaurus*.

During my examination of the specimen I was not without doubt respecting its identity; and had the two sides of the plate of bone been more nearly symmetrical, and the orbital spaces more perfect and more nearly opposite to each other, I should have inferred that it was a median bone. I have now, however, had all doubt as to the character of the fossil removed, having had the opportunity of inspecting a far more perfect cranial shield of a similar reptile, which shows that some of the processes have been broken off that in my possession, and that, by pressure or otherwise, its form has to some extent been altered. I therefore take the earliest opportunity of frankly acknowledging the general correctness of the criticisms of the writers alluded to.

Since writing the foregoing, I have seen an article by Messrs. Hancock and Atthey in the November 'Annals and Magazine of Natural History' on *Climaxodus* and *Janassa*, in which the writers endeavour to prove that the teeth which have been so named belong to the same genus. The specimens in my possession and those in the cabinets of three other palæontologists do not corroborate the opinions the writers have expressed. I have several specimens of *Climaxodontes*, varying in length from 1 inch to $\frac{1}{2}$ an inch; yet they have an equal number of ridges, and are not twisted and bent in the unsymmetrical manner represented in the ideal group of seven by which the article is illustrated. As I have not, however, obtained